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On Circulating Functions, and on the Integration of a Class of Equations of Finite Differences into which they enter as Coefficients. By John F. W. Herschel, *Esq. F.R.S.* Read February 19, 1818. [*Phil. Trans.* 1818, *p.* 144.]

The subject of recurring series, says the author, has been almost exhausted; but there is a class of series nearly allied to them, which contain a species of functions, which he calls circulating functions, which have never been systematically considered. Mr. Herschel proceeds to explain a direct method of solving all equations containing this kind of functions; and in the course of his investigation remarks a curious formula, which expresses the integer part of the quotient arising from the division of any one number by any other, —a circumstance which he observes may prove of considerable use in the theory of numbers.

On the Fallacy of the Experiments in which Water is said to have been formed by the Decomposition of Chlorine. By Sir Humphry Davy, *LL.D. F.R.S.* Read February 12, 1818. [*Phil. Trans.* 1818, *p.* 169.]

Some experiments having been communicated to the Royal Society of Edinburgh, leading to the inference that water is formed during the action of muriatic acid upon certain metals, and consequently that chlorine is decomposed, Sir Humphry was induced to repeat them; and ascertained that the water being derived from sources not suspected by the authors, their conclusions are unfounded. Muriatic acid gas was passed through red hot tubes of flint glass, and small portions of water were formed in consequence of its action upon the oxide of lead and the alkali of the glass.

When muriatic acid gas was passed over red hot iron in tubes containing common air, more water was formed in consequence of the union of the hydrogen of the acid with the oxygen of the air; but when every precaution was taken to avoid such sources of oxygen, the decomposition of muriatic acid gas was unattended by the smallest deposition of aqueous vapour. When muriate of ammonia is passed through tubes containing metals, it offers results analogous to those of the muriatic acid, and when moisture appears it may be referred to similar causes.

The author concludes with noticing a paper in the Mémoires d'Arcueil, by M. Berthollet, containing some slight mistakes as to the progress of his views upon the theory of chlorine. M. Berthollet states that MM. Ampere and Dulong had embraced the idea of the simple nature of chlorine previous to Sir H. Davy,—an assertion which is disproved by reference to the date of the author's first paper, and also by a quotation of a letter from M. Ampere, written on the 1st of November 1810.